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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,706	12/05/2003	Kang-Hyun Lee	OPP 031367 US	9971
36872	7590	09/12/2005	EXAMINER	
THE LAW OFFICES OF ANDREW D. FORTNEY, PH.D., P.C. 7257 N. MAPLE AVENUE BLDG. D, SUITE 107 FRESNO, CA 93720			NGUYEN, TUAN H	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/728,706	Applicant(s) LEE, KANG-HYUN	
	Examiner Tuan H. Nguyen	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Following is a rejection based on the newly cited reference(s).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narita et al. (cited U.S. Pat. No. 6,383,942) in view of Chung et al. (U.S. Pat. No. 6,750,150).

Narita et al., particularly figs. 15-22 and related text on col. 9-14 discloses substantially the claimed method for fabricating a metal line of a semiconductor device including the steps of forming an insulation layer 12 on a semiconductor substrate on which devices are formed; forming metal layer 13 including the lower metal layer 13d of TiN/Ti as a barrier layer (col. 11, first paragraph), intermediate metal layer of Al-Cu alloy 13a (col. 11, first paragraph), upper metal layer 13b of TiN/Ti (col. 8, fifth paragraph) on the insulation layer 12; forming an organic anti-reflection coating 13c on the metal layer 13 (col. 12, lines 44-45); forming a photoresist pattern 17 having an opening of certain width on the metal layer 13; selectively removing the metal layer 13

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at a lower side of the opening by dry etching using Cl_2/BCl_3 as an etching gas (col. 11, first paragraph) to form a plurality of metal lines (figs. 22A-22D).

Narita et al. lacks anticipation of forming a buffer layer on the photoresist pattern, including in the opening.

Chung et al., in a related art as shown in figs. 1-3 and text on col. 2-4, teaches the formation of buffer layer 150 comprises an oxide of PE family (col. 3, last two paragraphs to col. 4, first paragraph) over the photoresist pattern 130 for a subsequent of dry etching the underlying conductive layer 110. Note on col. 2, last line which suggests that layer 110 could be a metal layer.

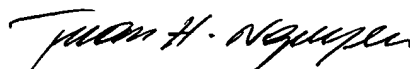
It would have been obvious to one having ordinary skill in the art at the time the invention was made to have form a buffer layer over the photoresist pattern as suggested by Chung et al. in Narita et al. process for fabricating a metal line since the buffer layer would enhance the etching resistance of the pattern photoresist, reduce the photoresist thickness to less than 9000 angstroms from conventional art to a desired ratio between the photoresist thickness and certain width, and problems associated with thick photoresist pattern in dry etching process, and be able to form a plurality of metal lines such that a dimension between adjacent metal lines is less than the certain width of the opening due to reducing the distance separating patterns on a photoresist by the buffer layer (Chung et al., col. 1, Background of the invention).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan H. Nguyen
Primary Examiner
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